**United States Department of Agriculture**
**Economic Research Service**
https://www.ers.usda.gov

United States
Department of
Agriculture

Economic
Research
Service

International
Economics
Division

# Revealed Competitive Advantage for Wheat

Thomas Vollrath



**REVEALED COMPETITIVE ADVANTAGE FOR WHEAT.** Thomas Vollrath. International Economics Division, Economic Research Service, U.S. Department of Agriculture. ERS Staff Report No. AGES861030.



## ABSTRACT

A new indicator of trade performance, called "revealed competitive advantage" (RCA), is used to examine the changing nature of wheat competitiveness and noncompetitiveness. Time series RCA measures for 5 wheat-exporting countries and 20 wheat-importing countries illustrate the dynamics of the international market to the year 2000. RCA comparisons for different agricultural commodities suggest that the U.S. wheat subsector is more internationally competitive than the U.S. agricultural sector as a whole. However, the U.S. wheat subsector is not performing as well as the oilseed and coarse grain subsectors. Three-fourths of the significant wheat-importing countries display a growing competitive disadvantage for wheat, providing evidence of increased specialization in world production.

Keywords: Wheat, agricultural trade, competitiveness, comparative advantage, exports, imports, projections.

## PREFACE

Wheat is the king of food grains in international trade. U.S. farmers produce a major share of that market, but their share has diminished since 1981.

This report is part of a comprehensive Wheat Competitiveness Study being conducted by the Economic Research Service. The study will help us to better understand competitiveness and how we compete in world agricultural markets.

The study focuses on factors that relate to the competitiveness of U.S. wheat in world markets ranging from natural endowments to technology to farm and trade policies. Major exporting countries (United States, Canada, Argentina, Australia, and France) are included, as are major importing countries and regions (North Africa, China, USSR, Eastern Europe, Mexico, and Brazil).

Other information related to the competitiveness of U.S. wheat exports is summarized in U.S. Competitiveness in the World Wheat Market: Proceedings of a Research Conference. Copies are available from Velmar Davis, Room 732, Economic Research Service, 1301 New York Ave., NW., Washington, DC 20005-4788; telephone (202) 786-1700.



1301 New York Avenue, NW.
Washington, DC 20005-4788

February 1987

## CONTENTS

## SUMMARY

A new indicator of trade performance, called "revealed competitive advantage" (RCA), is used to examine the hanging nature of wheat competitiveness and noncompetitiveness. RCA coefficients are largely determined by economic factors such as resource endowments, technology, and income that underlie the concept of comparative advantage. They are also affected by policy-induced price distortions that prevent actual trade flows from reflecting the real pattern of comparative advantage.

Time series RCA measures for 5 wheat-exporting countries and 20 wheat-importing countries illustrate the dynamics of the international market. Three-fourths of the significant wheat-importing countries display a growing competitive disadvantage for wheat, providing evidence of increased specialization in world production.

Throughout 1961-84, the United States had a positive RCA for wheat and wheat flour which demonstrates competitiveness in the world wheat market. However, the United States faces strong competitive pressures. Argentina, Australia, and Canada, three countries whose economies are relatively less diversified, showed a higher revealed competitive advantage for wheat and wheat flour than the United States. Among the principal wheat suppliers, only France displayed a lower revealed competitive advantage than the United States. But the wheat competitive gap between the United States and France is projected to narrow by the turn of the century.

RCA comparisons for different agricultural commodities suggest that the U.S. wheat subsector is more internationally competitive than the U.S. agricultural sector as a whole. However, the U.S. wheat subsector is not performing as well as the oilseed and coarse grain subsectors.

In the foreseeable future, Australia, Canada, and France (unlike the United States and Argentina) are likely to be comparatively more competitive in wheat than in coarse grains and oilseeds. However, Argentina will probably continue to be the most competitive of all wheat producers. Yet, Argentina is likely to remain relatively more competitive in oilseeds and coarse grains than in wheat with export growth for soybeans being greater than for either food or feed grains, unless relative prices induce a different agricultural growth pattern.

# Revealed Competitive Advantage for Wheat

Thomas Vollrath

## INTRODUCTION

Economics is concerned with welfare maximization. This involves use of the opportunity costs notion, basing resource allocation choices upon the best available alternative option. If the social welfare benefits of international exchange are to be realized, decisions need to be made as to what countries should produce and export which commodities and what commodities they should import. Comparative advantage provides the theoretical answer to such questions. The operational problem is identifying comparative advantage across countries and commodities.

Competitiveness is related to the issue of comparative advantage. Both are difficult to measure. However, competitiveness is somewhat less elusive because market prices can be used in its identification, whereas comparative advantage requires the use of shadow prices. When attempting to quantify either concept, one ought to bear in mind not only current conditions but also the longer term dynamic dimensions of market performance. It is also important to put commodity exports and imports into perspective because trade is dependent upon two-way traffic. This requires looking not only at the single commodity of interest but also at all goods and services.

There are many measures of competitiveness. Commonly used indicators include comparative efficiency, market share, export volume, and relative unit costs for capital, labor, land, and management. All of these provide useful information about certain aspects of commodity markets. However, the issue of competitiveness extends beyond any one of them. For instance, export volume and export market share, when applied to the wheat market, indicate which country provides how much wheat to world markets. But, neither measure puts wheat production, consumption, and trade into a particularly meaningful context; based upon the economic concept of opportunity costs.

In this report, a new and somewhat more comprehensive indicator of competitiveness is introduced that entails the use of both commodity and country relatives. This concept, "revealed competitive advantage" (RCA), is defined as the difference between a good's or service's relative export share and its relative import share.1/ A coefficient greater than zero indicates a competitive advantage for wheat; a coefficient less than zero indicates a competitive disadvantage.

"Revealed comparative advantage" (RCA) for wheat is defined as follows:

$$RCA_{i,wh} = RCS_{i,wh} - RCD_{i,wh}$$

1/ Balassa was the first to look at commodity-country relatives, using observed trade flows to generate estimates of "revealed comparative advantage." However, he used only export data. Both export and import data are used here to account for not only supply but demand, both of which underlie comparative as well as competitive advantage.

where

$$RCS_{i,wh} = [(X_{i,wh}/X_{i,gs})/(X_{w,wh}/X_{w,gs})] \text{ and}$$

$$RCD_{i,wh} = [(M_{i,wh}/M_{i,gs})/(M_{w,wh}/M_{w,gs})]$$

$RCS_{i,wh}$ refers to country i's "revealed comparative supply" for wheat, with X relating to export value while w and gs equate to the world and goods and services, respectively. $RCD_{i,wh}$ refers to "revealed comparative demand" with M meaning import value. The difference between $RCS_{i,wh}$ and $RCD_{i,wh}$ measures net relative trade shares and is called revealed competitive advantage, $RCA_{i,wh}$. (See Appendix A for further details.)

The RCA measure of competitiveness is structurally similar, though not identical, to the economic concept of comparative advantage. (See Appendix B for further details.) This measure embodies comparisons between traded commodities and among trading entities--enlarging the framework from which competitiveness is conventionally evaluated. RCA's reflect relative efficiencies, as do the economic concepts of opportunity costs and comparative advantage. They also incorporate relative distortions attributable to differential political support granted to special interest groups. The notion of comparative advantage does not allow for such distortions.

It would be highly desirable to be able to distinguish operationally between comparative advantage and revealed competitive advantage. The departure of revealed competitive advantage from real comparative advantage does not, however, vitiate the RCA measure. Given imperfections of the real world, it may not be wise for a country to base its resource allocation decisions exclusively upon comparative advantage, especially when others do not abide by the principles of the free market.

In the absence of relative distortions, RCA measures would be consistent with the economic principle of comparative advantage. Embedded in both the theoretical concept and the quantitative indicator are two comparisons, one between two trading entities (one country and the world) and the other between two commodities (one commodity and all goods and services). Neither concept relates to absolute advantage. RCA coefficients are largely determined by economic factors (resource endowments, technology, and income) that underlie the concept of comparative advantage. They are also affected by policy-induced price distortions that prevent actual trade flows from reflecting the real pattern of comparative advantage. Measures of RCA summarize how a country or region has performed in commodity trade based not only upon the relative determinants underscoring actual comparative advantage, but also on the impact of both national and trade policies. Therefore, RCA's are better indicators of competitiveness than of the economic notion of comparative advantage.

Relativity has important economic implications. For example, one country may have (in comparison with the rest of the world) an absolute cost advantage in the production of all commodities. Yet, this country can benefit from international exchange by exporting commodities with a relative advantage and importing others with a relative disadvantage. Free trade enables consumers throughout the world to increase their living standards because of lower prices for purchased goods and services.

Another consequence of relativity is that no country can have RCA's greater than zero for all commodities. Trade must flow in two directions. One country's exports generate foreign exchange used to buy another country's imports and vice versa. Every country has a pattern of comparative competitiveness based upon relative factor endowments and the composition of relative foreign/domestic policies. Natural operating forces of a free market generate price signals that induce appropriate capital accumulation. However, governments can devise policies favoring a targeted commodity that result in comparative competitiveness for that

commodity in the short run and, possibly, the emergence of a real comparative advantage in the long run. While such policy intervention benefits some commodity interest groups, it implicitly discriminates against other groups. In the absence of a clearly defined and well-specified social welfare function that meets general approval, policymakers may find it best to adopt a neutral stance and let market forces make allocation decisions.

## COMPETITION FROM PRINCIPAL SUPPLIERS

The United States is the largest world supplier of wheat, exporting an average of 41.6 million metric tons of wheat and wheat flour (39 percent of the world wheat market) during 1980-84 (table 1). Principal competitors for the wheat and wheat flour market are Canada, France, Australia, and Argentina. Those four countries combined accounted for 47 percent of the world market during 1980-84.

The United States had a positive RCA for wheat and wheat flour throughout 1961-84, demonstrating the competitiveness of the U.S. wheat sector compared with other countries and relative to other domestically produced commodities (figs. 1 and 2). U.S. wheat RCA's rose rapidly during the 1972-74 world food crisis when the United States was able to supply needed food grains to many developing countries and to planned economies experiencing shortfalls in domestic production. U.S. wheat RCA's also rose sharply during 1977-79, when U.S. exports were priced low in foreign currencies because of the undervalued U.S. dollar.

The United States shows a higher revealed competitive advantage for wheat and wheat flour than France. However, Argentina's, Australia's, and Canada's RCA for wheat and wheat flour are higher than the U.S. RCA. This is not a surprise since these three countries have economies less diversified and mature than the United States.

Among the principal world suppliers of wheat and wheat flour, the United States has maintained its competitive ranking throughout 1961-84, except in 1969 when France's RCA rose higher and in 1973 when both Australia's and Argentina's fell lower. The United States narrowed the competitive gap with Canada during 1964-74. Argentina has experienced the most rapid RCA growth of all the principal wheat suppliers since 1973.

Estimates of wheat RCA's were made to the year 2000 by applying linear regression coefficient weights to independent projections of its eight components. However, RCA estimates using baseline component projections may not accurately reflect the future because of exogenous shocks to the policy environment or fundamental changes in market conditions. An exporting country could, for instance, enact a policy to expand its market share regardless of marginal social welfare costs. To evaluate the consequences of such contingencies on relative wheat competitiveness, two alternative projection scenarios were identified for each exporting country. One scenario showed a 20-percent increase in projected wheat and wheat flour exports for the year 2000 and the other showed a 20-percent decline. These changes were geometrically distributed throughout the projection period to show probable paths of adjustment between 1985 and 2000.

### Canada

Canada, the second largest world supplier of wheat and wheat flour (after the United States), exported an average of 19.5 million metric tons during 1980-84. Comparisons of the future wheat RCA possibilities show the United States being relatively more competitive than Canada by the year 2000 in four of the nine given scenario combinations (fig. 3). The future competitive ranking between the United States and Canada will depend, in part, upon each country's wheat export supply response to changing global market conditions.

Table 1--Top five exporters of wheat and wheat flour
(based on 1980-84 net export average)

| Country | 1961-65 | 1966-70 | 1971-75 | 1976-80 | 1980-84 |
|---|---|---|---|---|---|
| | | | 1,000 metric tons 1/ | | |
| Net exports: | | | | | |
| United States | 20,002 | 18,799 | 27,266 | 31,955 | 41,639 |
| Canada | 11,813 | 10,939 | 12,741 | 14,466 | 19,466 |
| France | 3,008 | 4,717 | 7,260 | 9,008 | 13,974 |
| Australia | 6,072 | 6,453 | 7,466 | 9,814 | 11,113 |
| Argentina | 3,243 | 2,891 | 1,925 | 3,981 | 5,960 |
| World total | 51,158 | 54,854 | 68,820 | 81,787 | 107,467 |
| Share of total world exports: | | | Percent | | |
| United States | 39.1 | 34.3 | 39.6 | 39.1 | 38.7 |
| Canada | 23.1 | 19.9 | 18.5 | 17.7 | 18.1 |
| France | 5.9 | 8.6 | 10.5 | 11.0 | 13.0 |
| Australia | 11.9 | 11.8 | 10.8 | 12.0 | 10.3 |
| Argentina | 6.3 | 5.3 | 2.8 | 4.9 | 5.5 |

1/ Wheat equivalent.
Source: Cesal, Lon C., and others. Data from Agricultural Growth Markets in a World Economy. U.S. Dept. of Agr., Econ. Res. Serv., forthcoming.

Figure 1
Selected major wheat exporters: Revealed competitive advantages for wheat and wheat flour

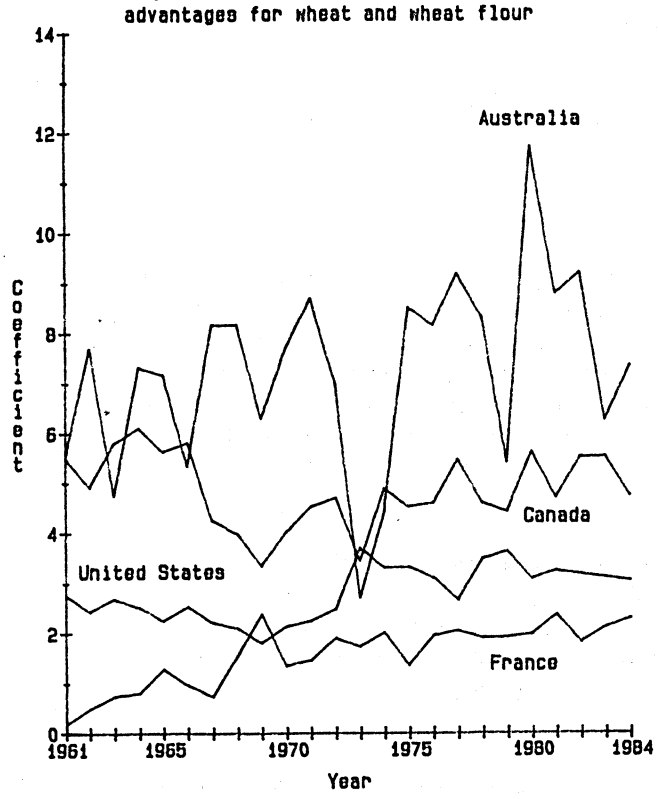
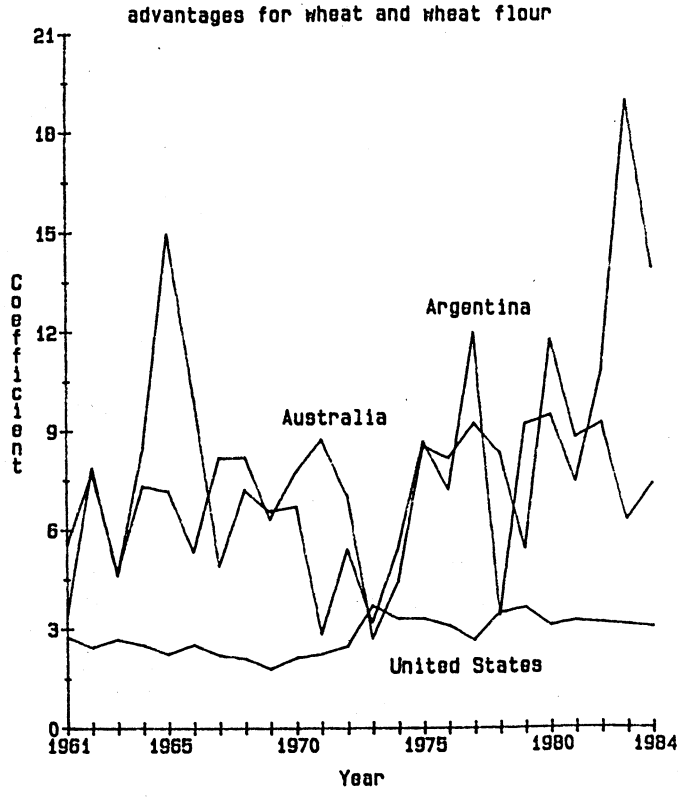



Figure 2
Selected major wheat exporters: Revealed competitive advantages for wheat and wheat flour



The 1985 U.S. farm act lowered wheat loan rates 25 percent. Since Canada has become a price taker following the emergence of the United States as the dominant wheat exporter in the early seventies, the Canadian Wheat Board is likely to lower its initial payment which represents a guaranteed producer floor price. If the Canadian supply response to the drop in the U.S. loan rate is inelastic, Canadian wheat exports at the turn of the century could decline less than 20 percent of the year-2000 time trend projection.

Canadian wheat exports might, however, decline 20 percent from the projected year-2000 level. If so, the United States will likely become comparatively more competitive in wheat than Canada is. Canadian wheat exports could be lower than anticipated because Canada's export supply response to a decline in the world wheat price may be elastic in the near future. This is possible since many of Canada's long-term trading agreements (with such countries as USSR, Brazil, Egypt, and Iraq) have nearly expired. Smaller than projected Canadian export volume could result for other reasons as well. For example, the gradual elimination of transportation subsidies and/or low foreign demand may put additional pressure on Canadian wheat farmers, perhaps forcing some out of business and causing cutbacks in national production.

Canada could, on the other hand, increase its wheat exports above baseline projected levels; in which case Canada would likely become more competitive than the United States, widening the wheat RCA gap. Reasons for a larger than anticipated increase in exports of Canadian wheat include.

- o The dependence of the Canadian wheat sector on the international market (three-fourths of domestic production is sent abroad).

- o The dearth of production alternatives in Canadian wheat-growing areas (barley brings lower returns per acre, rapeseed is considered more risky, and soybeans are an untried option).

- o The steady deterioration of the Canadian dollar vis-a-vis the U.S. dollar since the late seventies.

## France

The United States has a revealed wheat competitive advantage that has exceeded France's wheat RCA in every year during 1961-84, except for 1969 (fig. 4). But France, which captured 13 percent of the world market during 1980-84, has narrowed the competitive gap over the years. In four of the nine scenario combinations, France is projected to achieve higher wheat RCA's than the United States by the turn of the century. The rise in France's competitive position can be explained by increased protectionism and productivity gains achieved under the umbrella of the European Community's (EC) Common Agricultural Policy (CAP), established in 1962.

The CAP transformed EC agriculture, especially in France because of its relatively well-endowed agricultural resource base. The main feature of the CAP policy is protection that not only insulates EC farmers from international competitive pressures but enables the domestic research and development (R&D) infrastructure to develop modern technology. Growth of wheat yields in France has been phenomenal, averaging 4.6 percent per year over the last 8 years.

Rapid growth in agricultural production and modest demand growth in the EC have generated surpluses of some commodities (such as wheat and wheat flour). Because of these surpluses, subsidies (restitutions) emerged that provide selected export products the same price and

disposal guarantees given products sold within the European Community. These restitutions enlarged the EC budget. Should the the value of the U.S. dollar continue its recent decline or even stay at its current level (30 percent below the January 1, 1986, rate) export refunds will become increasingly costly for EC members. Support for EC wheat farmers could, therefore, decline--lowering France's competitive ranking with the United States and diminishing its wheat exports. However, the CAP may continue to support wheat producers in the foreseeable future, despite budgetary costs.

### Australia

An Australian-U.S. comparison of projected wheat RCA scenarios shows that the United States would become more competitive than Australia by the year 2000 if U.S. wheat exports increased 20 percent beyond projected baseline levels and Australian wheat exports decreased 20 percent below projected values (fig. 5). The probability of such a combined occurrence is greater now than before the 1985 farm act. Australia, being a price taker on the international wheat market, is concerned about lower U.S. loan rates and the U.S. Export Enhancement Program. These policies are likely to reduce world grain prices further, possibly resulting in the loss of foreign markets for Australian wheat. Moreover, Australian wheat exports would suffer should the Australian dollar appreciate against the U.S. dollar, giving the United States an added competitive edge.

It seems more probable, however, that Australia will retain its favorable competitive position relative to the United States, especially in the long run. Australian wheat production (80 percent of which is exported) is a comparatively more important economic activity than in the United States. Within Australia, wheat production is also comparatively efficient and is relatively free of subsidies, unlike manufactured goods. Moreover, there are possibilities for improvements in efficiency that could lead to market share growth beyond the 1980-84 average of 10.3 percent. For example, if the Australian Wheat Board disaggregates the currently pooled charges for handling, storage, and transportation, efficiency gains may lower f.o.b. prices because producing areas will pay for their own marketing costs. These three charges account for a fourth of the gross value of Australian wheat. There is also the possibility that allowing private traders to compete with the Australian Wheat Board might provide additional market efficiencies.

Wheat has historically been a more important source of foreign exchange for Australia than most other goods and services. Its continued relative importance is likely to persist in the foreseeable future, causing little if any deterioration in Australia's wheat RCA.

### Argentina

Argentina is a principal agricultural competitor of the United States. Argentina will probably retain a higher RCA in wheat than the United States through the remainder of this century, even if its projected wheat and wheat flour exports fall 20 percent below projected base levels and U.S. exports rise 20 percent (fig. 6). One reason Argentina has such a strong competitive position is that agriculture is an extremely important trade sector, providing 75-80 percent of its foreign exchange earnings.

Taxes of agricultural exports have been a major source of Government revenue in Argentina, providing 20 percent of budgetary income. Export taxes have lowered profitability in farming and have put Argentina on a slower agricultural growth path. A policy shift has recently occurred, however. The Government has decided to support agricultural production and exports so that the large external debt can be financed. Export taxes (which for wheat equaled 18 percent of f.o.b. prices in March 1985) are scheduled to be substantially reduced or totally eliminated. The aim of this action is to make Argentine exports more competitive in world

Figure 3
Canada and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

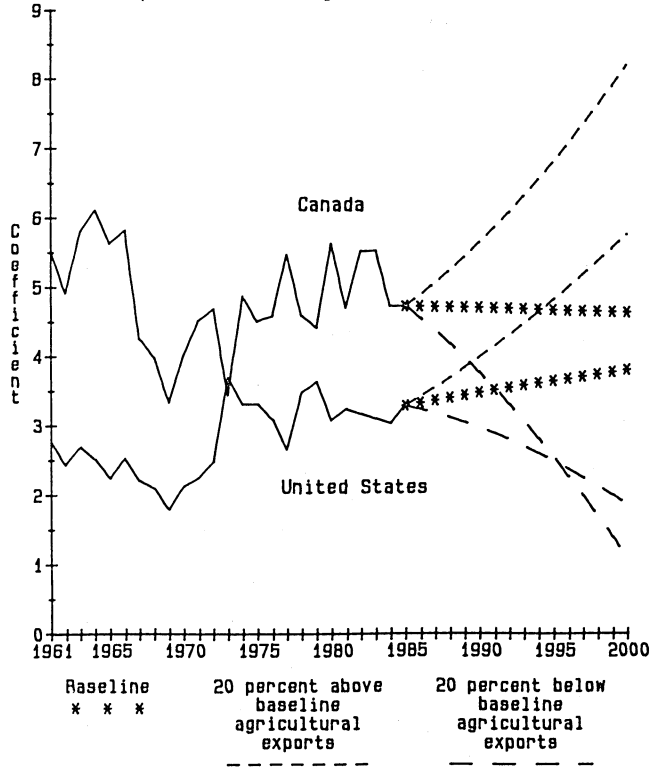



Figure 4
France and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

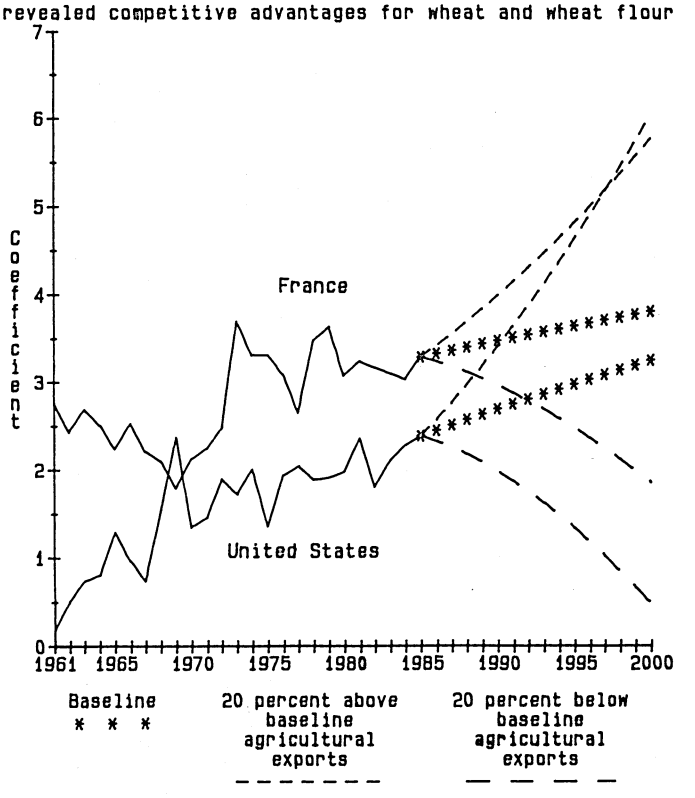



Figure 5
Australia and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

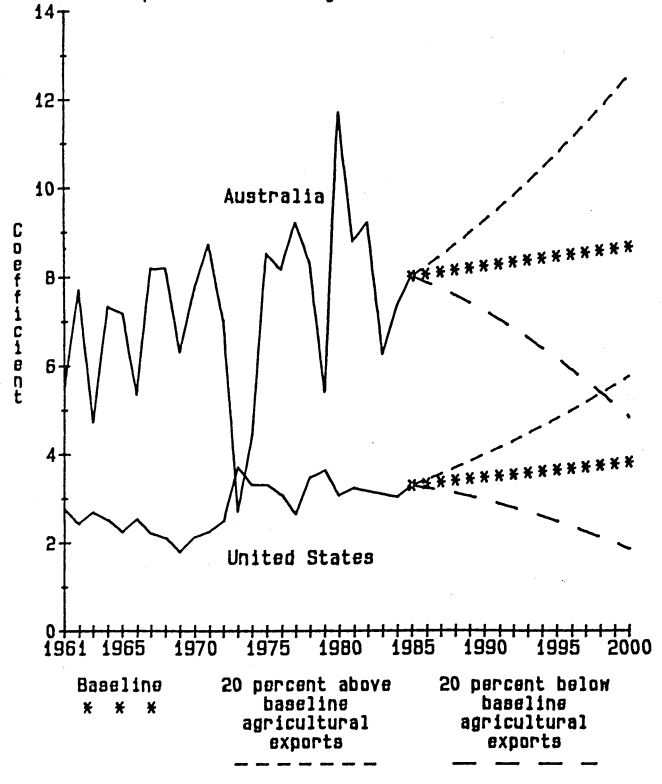
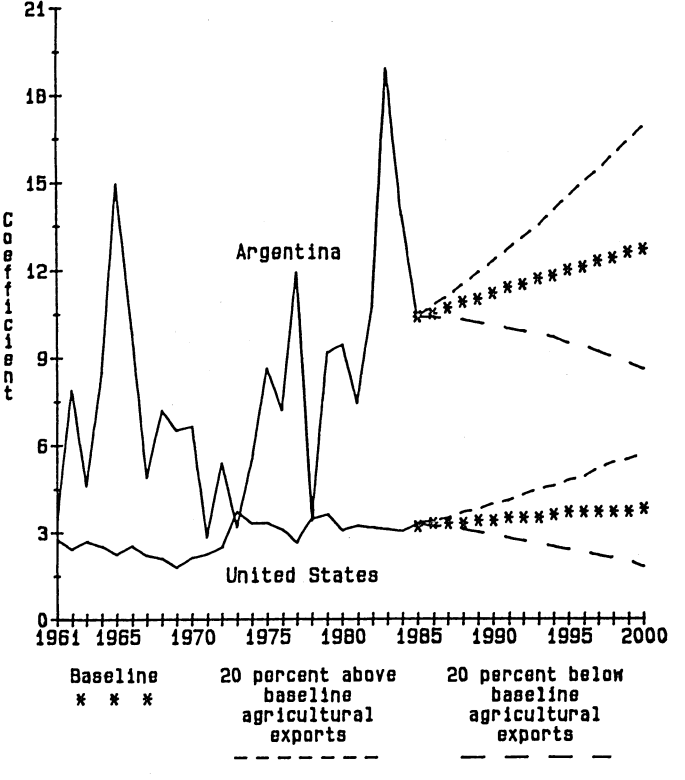



Figure 6
Argentina and United States: Actual and projected revealed competitive advantages for wheat and wheat flour



markets by providing farmers with financial incentives to increase agricultural production. If history is a guide, the likelihood of achieving this objective is excellent. Export tax reductions in the late seventies caused Argentina's wheat RCA to increase until 1982 when its export taxes rose and the wheat RCA fell.

In addition to a favorable policy environment, improvements in Argentina's agricultural infrastructure would increase its relative wheat competitiveness, causing the wheat RCA to rise faster than at the projected baseline rate. Currently, internal storage facilities are limited and virtually no chemicals are used to augment agricultural productivity. Both yield and output would increase if the Government encouraged fertilizer use for wheat, further enhancing Argentina's competitiveness.

## THE COMMODITY COMPOSITION OF AGRICULTURAL COMPETITION

Wheat and wheat flour exports provided 23 percent of total U.S. agricultural exports during 1980-84. In addition to wheat, coarse grains and oilseeds were other sources of foreign exchange export earnings. Coarse grain exports provided 45 percent of total U.S. agricultural foreign exchange earnings in 1980, while soybeans and groundnuts (including beans, oil, and meal) generated 28 percent.

Examination of the RCA composition for total agriculture, wheat and wheat flour, soybeans and groundnuts, and coarse grains provides another perspective of competitiveness. In the United States, food grains, feed grains, and oilseeds display a comparative competitiveness greater than the agricultural sector as a whole (fig. 7). The wheat and wheat flour subsector is, however, not performing as well as either the soybean and groundnut or coarse grain subsectors. Historically, the U.S. soybean and groundnut subsector outperformed the coarse grain subsector. However, baseline projections indicate that the trade performance of coarse grains could outstrip that of oilseeds by 1990.

Figure 7
United States: Actual and projected revealed competitive advantages for selected commodities

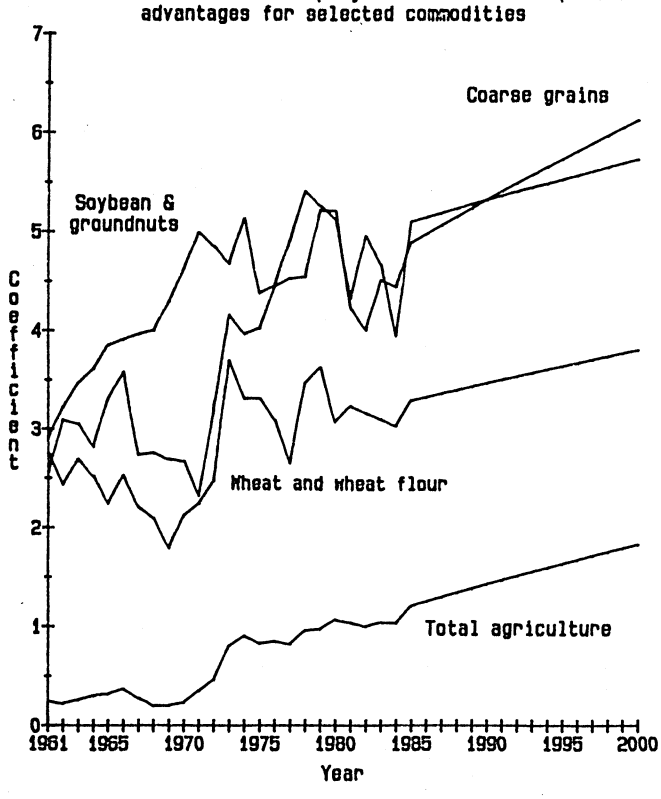


Figure 8
Canada: Actual and projected revealed competitive advantages for selected commodities

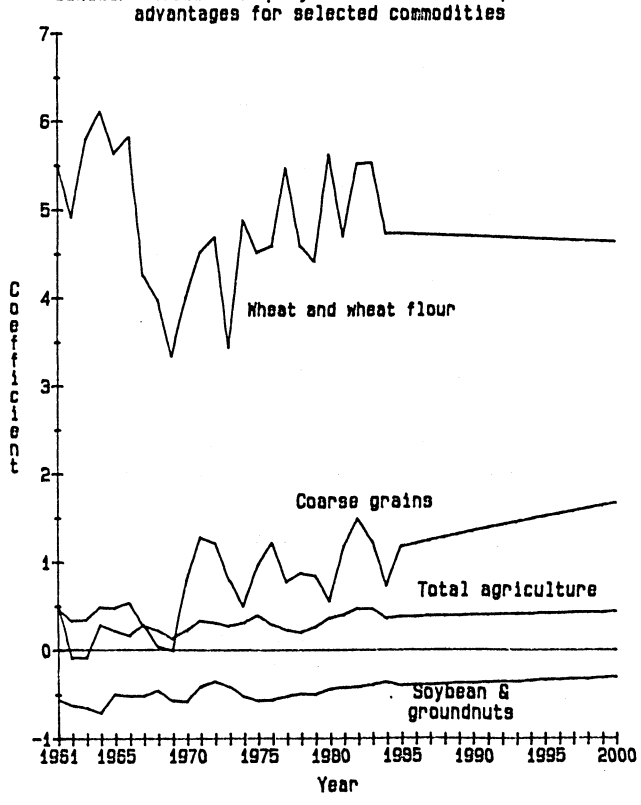



Figure 9
France: Actual and projected revealed competitive advantages for selected commodities

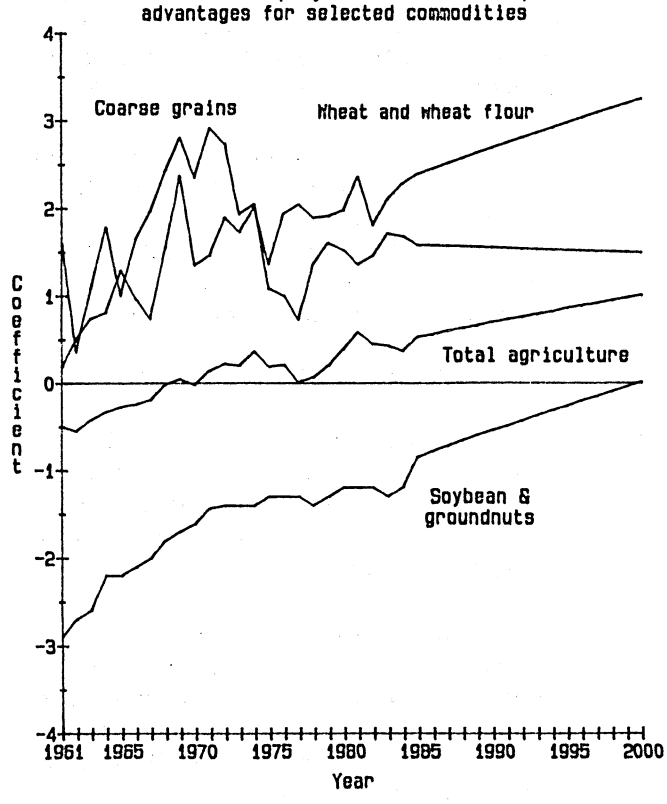



Figure 10
Australia: Actual and projected revealed competitive advantages for selected commodities

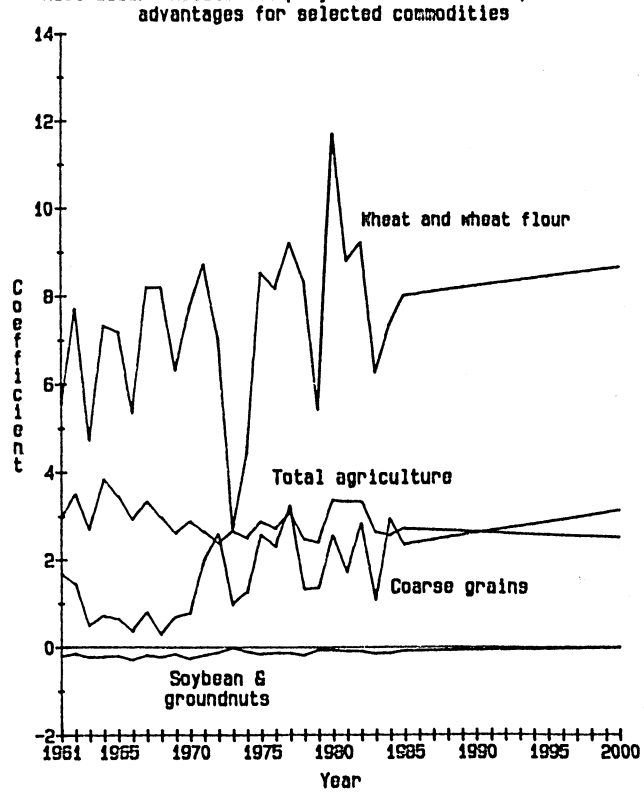
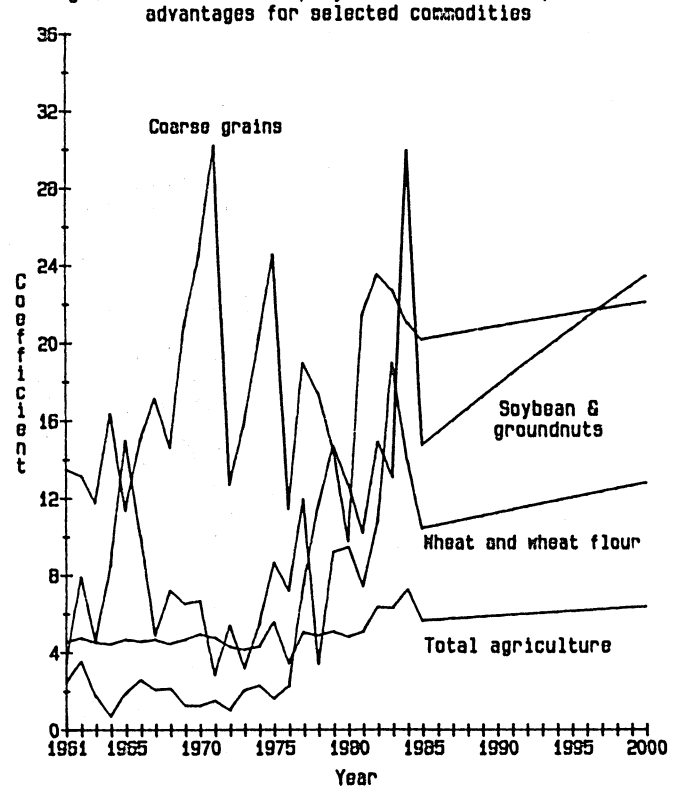



Figure 11
Argentina: Actual and projected revealed competitive advantages for selected commodities



Canada, France, Australia, and Argentina all have wheat RCA's that are larger than their RCA's for total agriculture, demonstrating the strength of wheat and wheat flour relative to total agriculture (figs. 8-11). This is not a surprising result given the fact that these countries and the United States supplied 86 percent of the world wheat import demand during 1980-84.

Argentina is the only country that competes with the United States in food grains, feed grains, and oilseeds. Argentina could be considered the single most significant competitor of U.S. agriculture because it has higher RCA's than the United States for these commodities, all three of which are important to U.S. agricultural prosperity.

It is unclear how the shift in the Argentine tax base will affect the composition of its agricultural exports. In the past, wheat and wheat flour received preferential treatment, bearing a smaller export tax rate than either coarse grains or soybeans and groundnuts. The elimination of export taxes in Argentina is, therefore, likely to be less beneficial to wheat producers than to other agricultural producers. The shift to the land tax, however, is likely to lead to more double-cropping, inducing greater growth in the export supply of both soybeans and wheat relative to coarse grains.

The wheat and wheat flour subsector is relatively more important in Canada, France, and Australia than in Argentina. In fact, Canada, France, and Australia are characterized by soybean and groundnut RCA's that historically have been negative, suggesting a competitive disadvantage for these two oilseeds.

Canada and Australia show a stronger RCA in wheat and wheat flour than in other agricultural commodities during both the historical and projected periods. France's wheat and wheat flour became more competitive than coarse grains in 1975. Baseline projections suggest that France's wheat and wheat flour subsector is likely to strengthen its RCA position relative to other agricultural commodities in the future, unless there is a major shift in policy.

## GROWTH PATTERNS FOR 20 MAJOR IMPORTERS

It is instructive to examine both the changing pattern and likely projections of revealed competitive disadvantage (advantage) for the most significant importers of wheat and wheat flour (table 2). In figures 12 through 31, three scenarios are portrayed for each of the 20 countries having the largest 1980-84 net imports of wheat and wheat flour.

As with the five most significant exporters, the base scenario for each of the major importers entails making projections of RCA for wheat and wheat flour to the year 2000. This is done by applying linear regression coefficient weights to the independent projections of the eight components of wheat RCA. The other two scenarios involve a 20-percent increase and 20-percent decrease in the value of projected wheat and wheat flour imports.

All 20 countries showed negative wheat RCA's throughout most if not all of the last 24 years, indicating that these countries possessed a revealed competitive disadvantage in wheat and wheat flour. Downward wheat RCA's illustrate increased reliance upon the international market to supply domestic wheat consumption needs. It also provides indirect evidence of increased product specialization by importing countries. Expansion of commodity exports is needed to generate foreign exchange that will enable these countries to purchase goods, such as wheat and wheat flour, on the world market.

Under the projected baseline scenario, three-fourths of the wheat-importing countries display continued declines in their comparative wheat competitiveness to the end of the century. The

Table 2--Top 20 importers of wheat and wheat flour based on 1980-84 net import average

| Country | 1961-65 | 1966-70 | 1971-75 | 1976-80 | 1980-84 |
|---|---|---|---|---|---|
| | | | 1,000 metric tons 1/ | | |
| Net imports: | | | | | |
| USSR | 71 | -2,477 | 2,317 | 7,494 | 19,172 |
| China | 4,570 | 4,840 | 4,501 | 7,251 | 11,885 |
| Egypt | 1,755 | 1,983 | 2,630 | 4,721 | 6,060 |
| Japan | 3,108 | 4,152 | 5,250 | 5,658 | 5,536 |
| Brazil | 2,157 | 2,381 | 2,206 | 3,762 | 4,478 |
| Poland | 1,705 | 1,256 | 1,604 | 2,697 | 3,026 |
| Algeria | 361 | 594 | 1,192 | 2,251 | 2,901 |
| Iraq | 150 | 99 | 443 | 1,302 | 2,427 |
| Iran | 247 | 100 | 1,096 | 815 | 2,181 |
| South Korea | 526 | 989 | 1,703 | 1,822 | 2,065 |
| Morocco | 289 | 544 | 885 | 1,446 | 1,967 |
| Italy | 736 | 653 | 1,270 | 2,191 | 1,937 |
| India | 4,529 | 5,344 | 3,095 | 1,347 | 1,788 |
| Indonesia | 101 | 337 | 647 | 955 | 1,519 |
| Bangladesh | 459 | 790 | 1,679 | 1,108 | 1,519 |
| Nigeria | 68 | 174 | 374 | 1,004 | 1,371 |
| Chile | 257 | 352 | 638 | 830 | 1,001 |
| Peru | 411 | 564 | 622 | 740 | 876 |
| Venezuela | 424 | 679 | 619 | 746 | 859 |
| Philippines | 414 | 556 | 592 | 722 | 829 |
| | | | Percent | | |
| Share of total world imports: | | | | | |
| USSR | 7.9 | 5.3 | 11.8 | 12.3 | 20.0 |
| China | 9.5 | 9.0 | 6.7 | 8.9 | 11.2 |
| Egypt | 3.6 | 3.7 | 3.9 | 5.8 | 5.7 |
| Japan | 6.5 | 7.8 | 7.9 | 7.1 | 5.4 |
| Brazil | 4.4 | 4.4 | 3.3 | 4.6 | 4.2 |
| Poland | 3.5 | 2.3 | 2.4 | 3.4 | 2.9 |
| Algeria | .8 | 1.1 | 1.8 | 2.8 | 2.7 |
| Iraq | .3 | .2 | .7 | 1.6 | 2.3 |
| Iran | .5 | .3 | 1.6 | 1.0 | 2.0 |
| South Korea | 1.1 | 1.8 | 2.5 | 2.2 | 1.9 |
| Morocco | .6 | 1.0 | 1.3 | 1.8 | 1.8 |
| Italy | 1.9 | 2.2 | 2.7 | 3.7 | 3.1 |
| India | 9.2 | 9.9 | 4.8 | 2.0 | 1.7 |
| Indonesia | .2 | .6 | 1.0 | 1.2 | 1.4 |
| Bangladesh | .9 | 1.5 | 2.5 | 1.4 | 1.4 |
| Nigeria | .1 | .3 | .6 | 1.2 | 1.3 |
| Chile | .5 | .6 | .9 | 1.0 | .9 |
| Peru | .8 | 1.0 | .9 | .9 | .8 |
| Venezuela | .9 | 1.3 | .9 | .9 | .8 |
| Philippines | .8 | 1.0 | .9 | .9 | .8 |

1/ Wheat equivalent.

Source: Cesal, Lon C., and others. Data from Agricultural Growth Markets in a World Economy. U.S. Dept. Agr., Econ. Res. Serv., forthcoming.

Figure 12
USSR and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

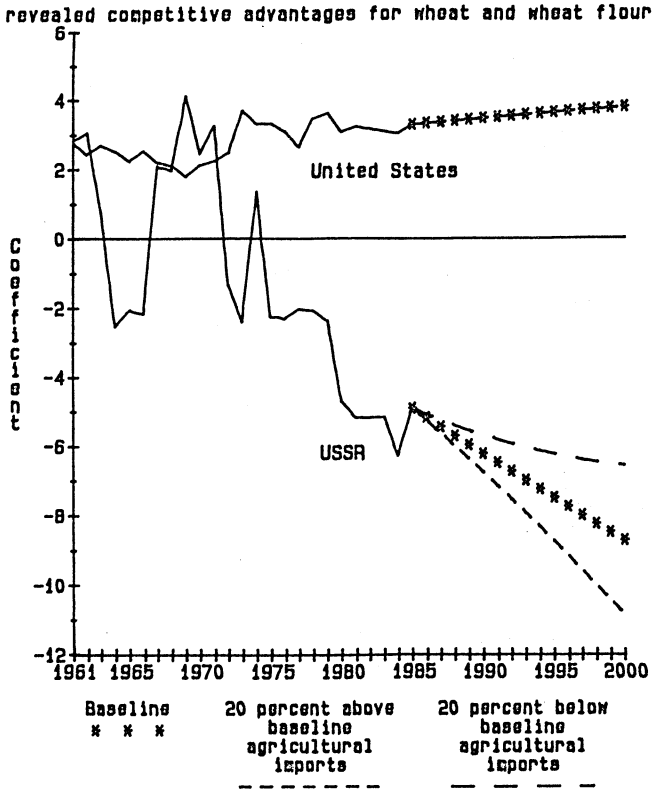



Figure 13
China and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

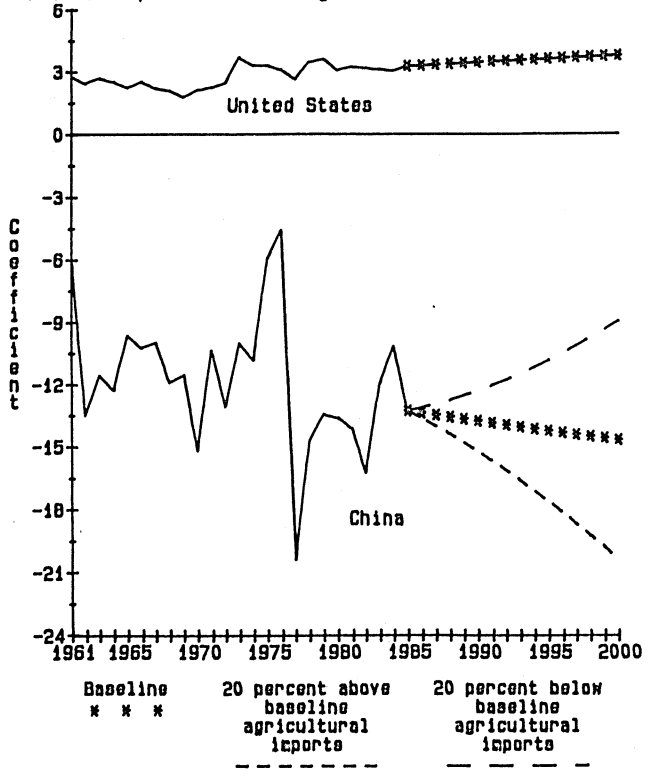



Figure 14
Japan and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

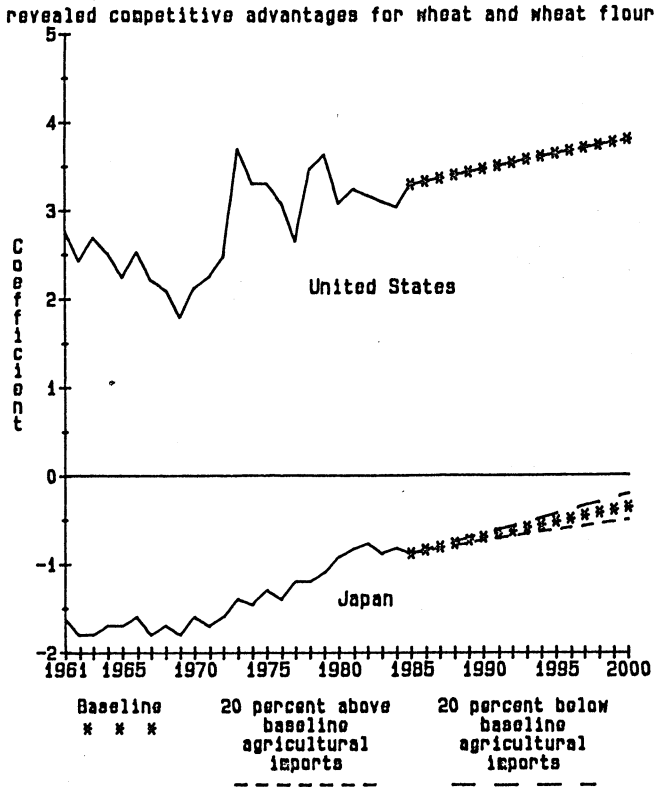



Figure 15
Egypt and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

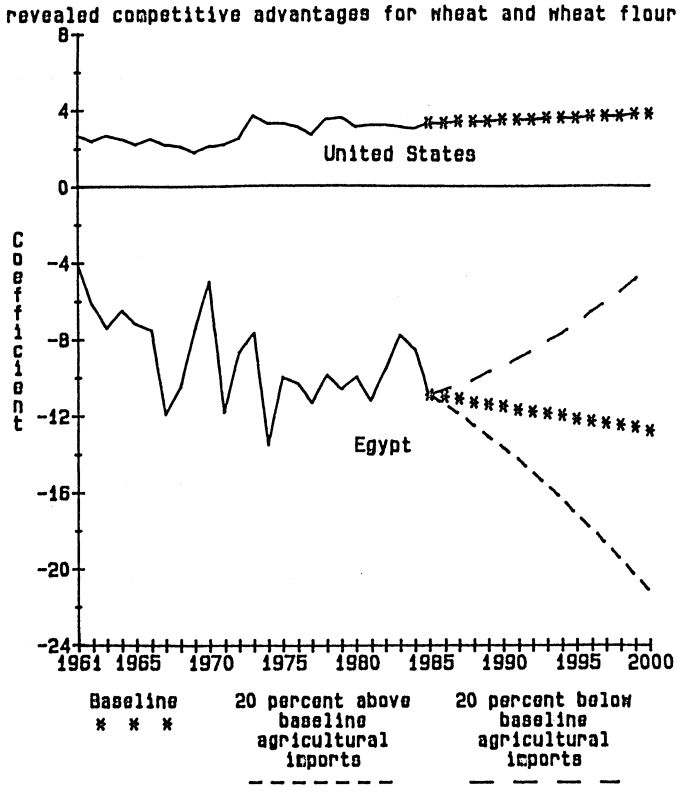


Figure 16
Brazil and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

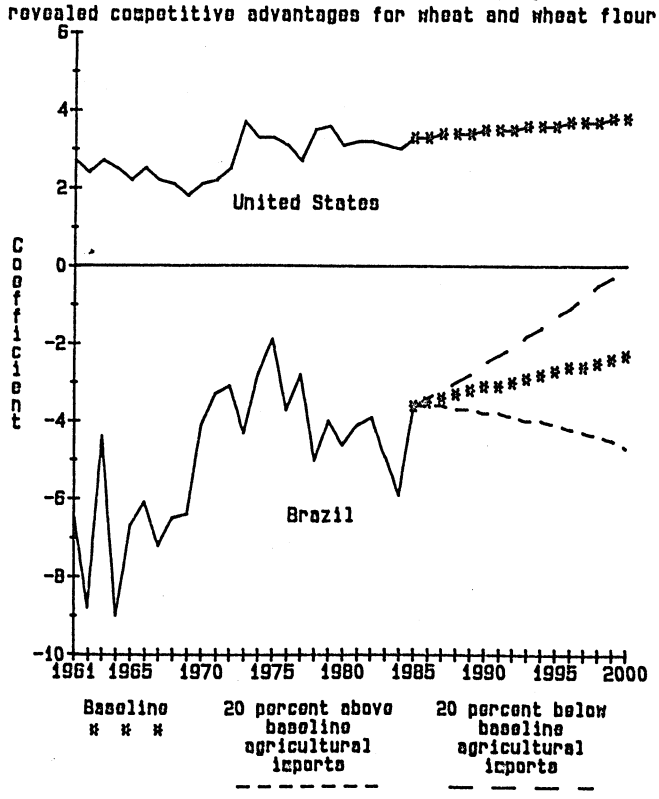



Figure 17
Algeria and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

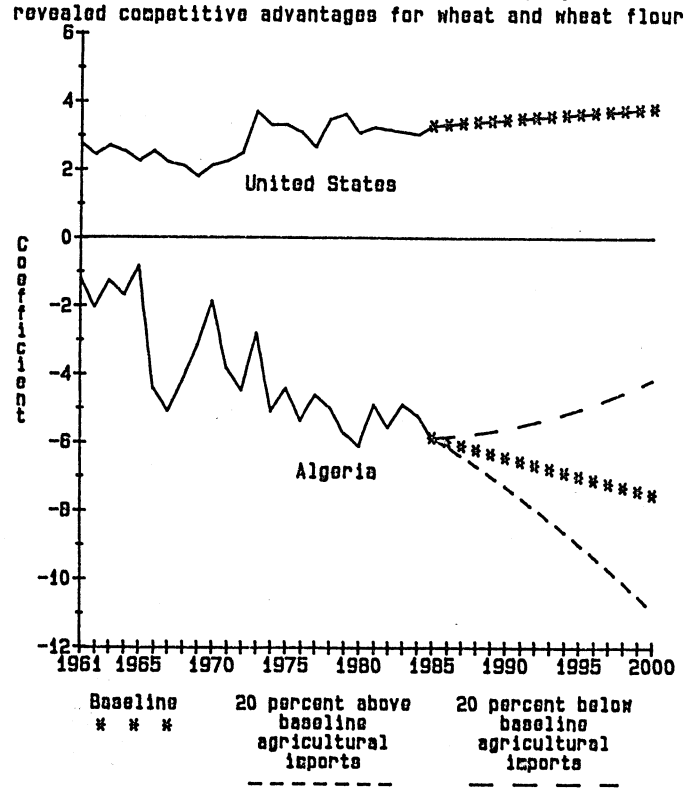



Figure 18
India and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

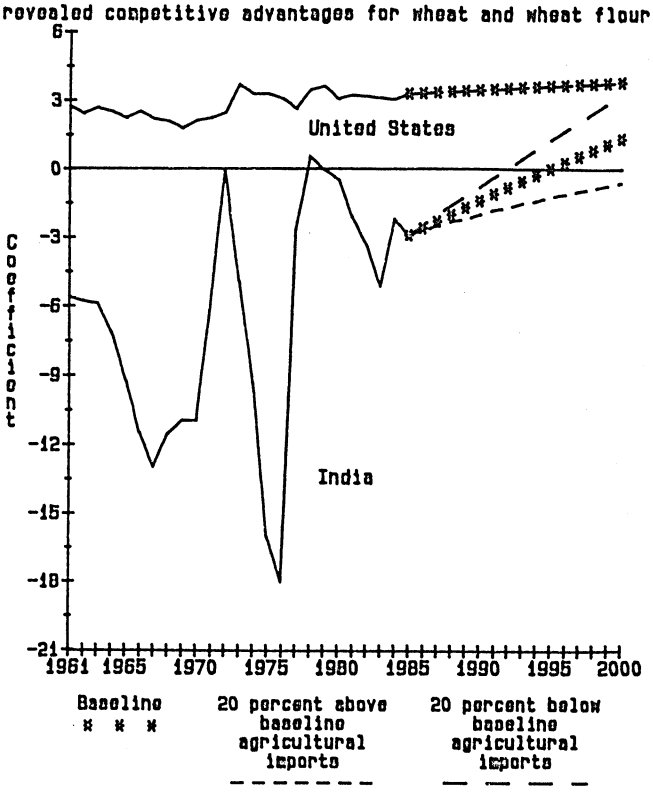



Figure 19
Italy and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

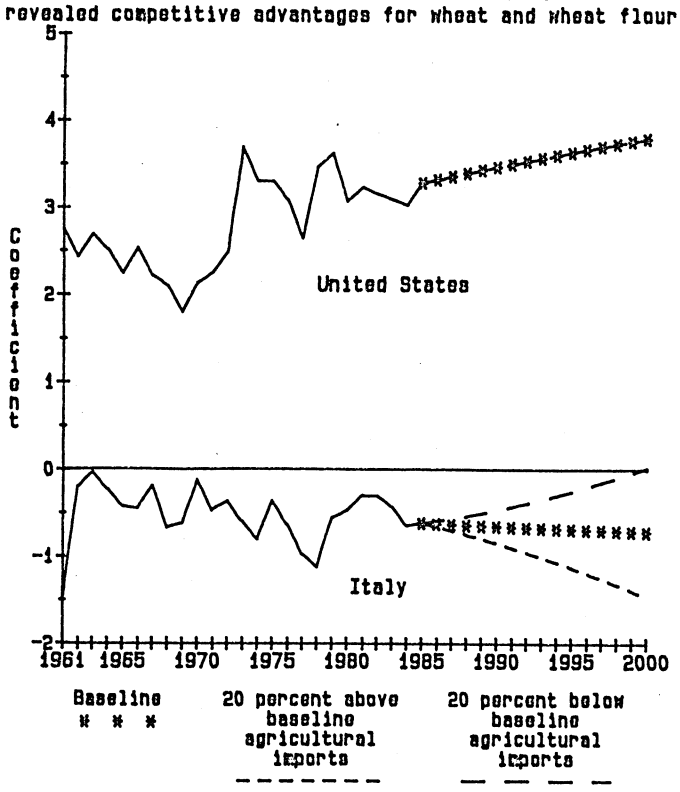


Figure 20
Poland and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

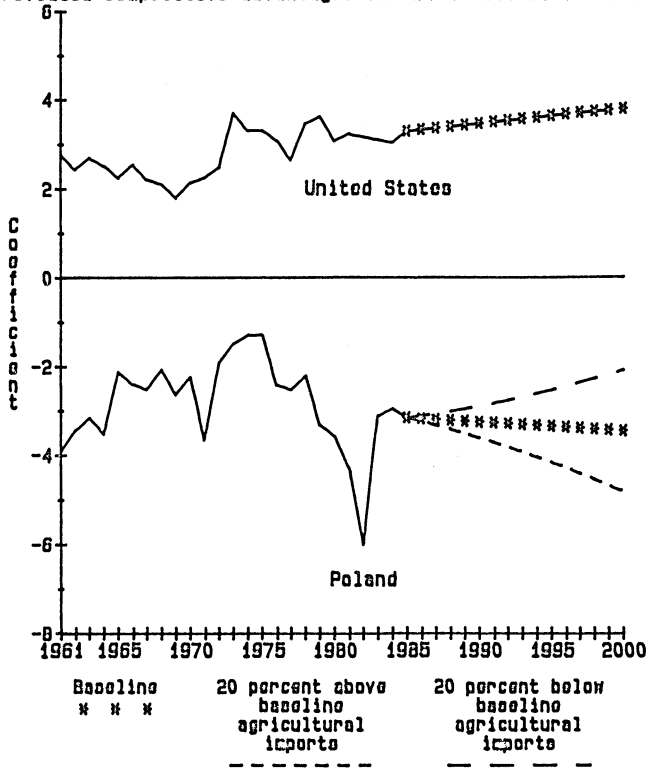



Figure 21
Iraq and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

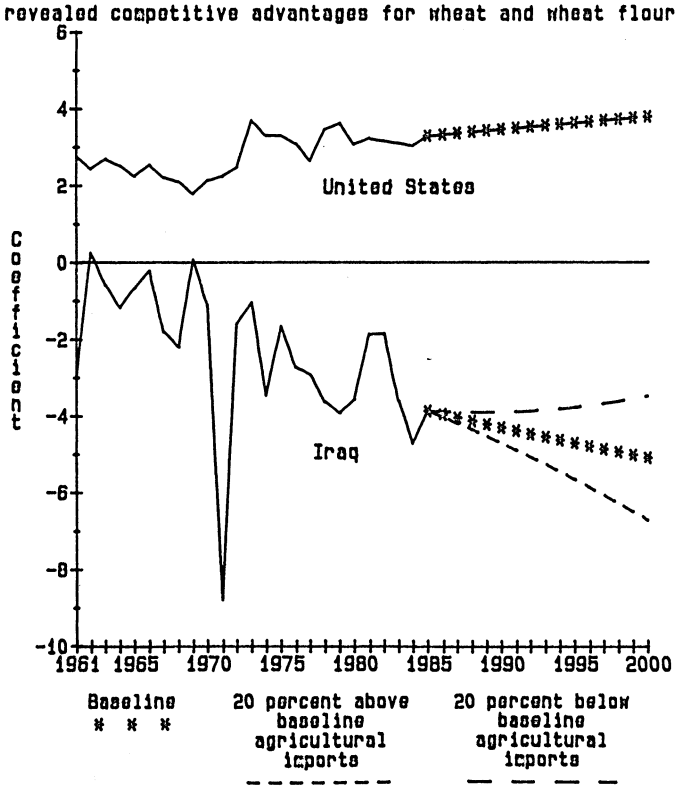



Figure 22
South Korea and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

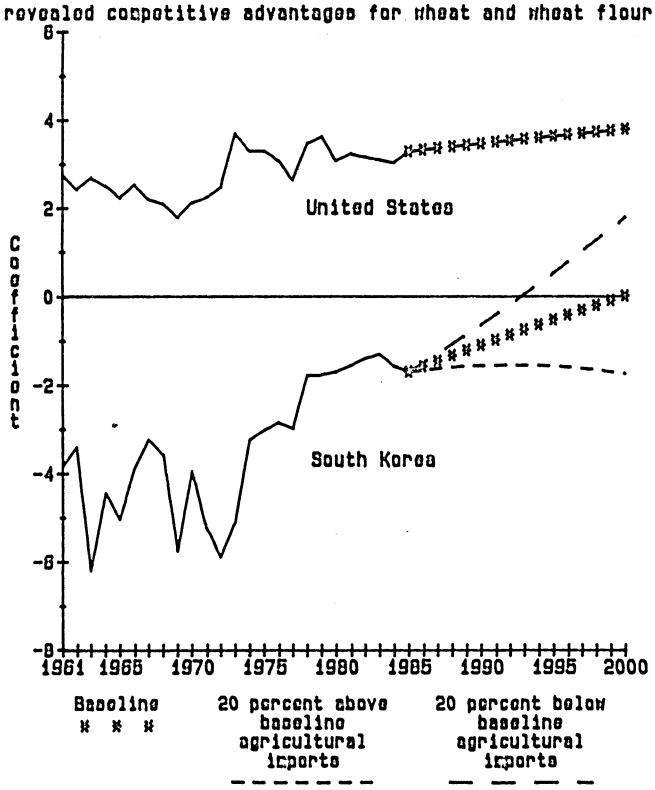



Figure 23
Iran and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

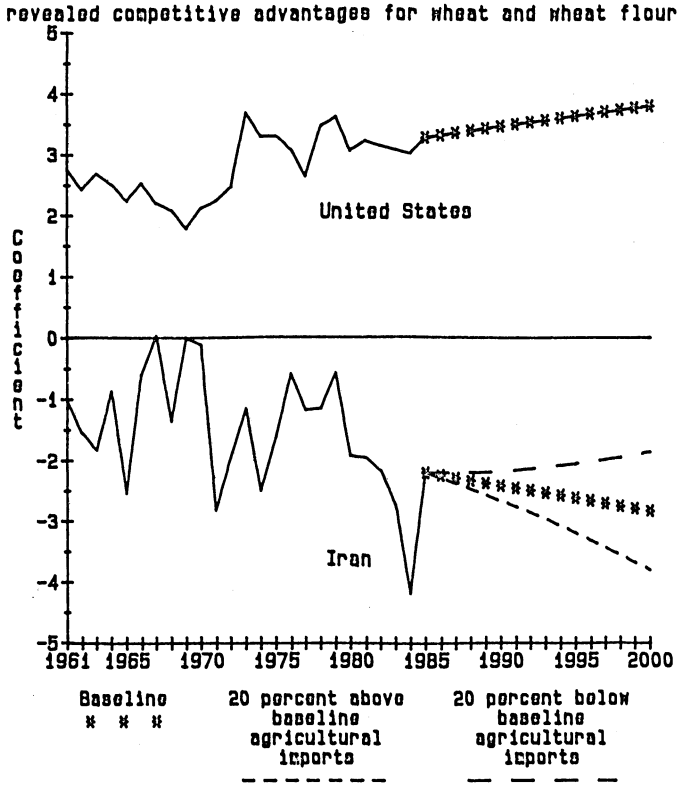


Figure 24
Morocco and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

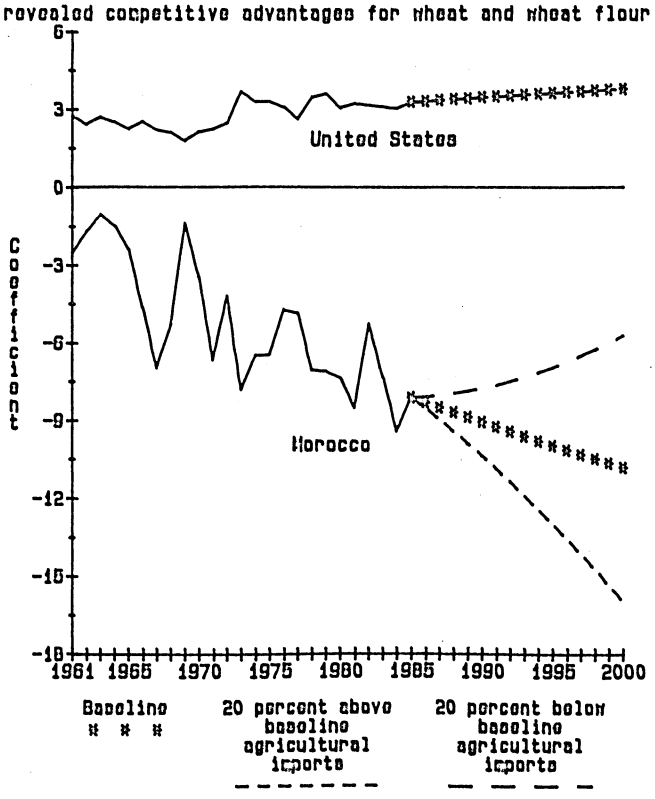



Figure 25
Nigeria and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

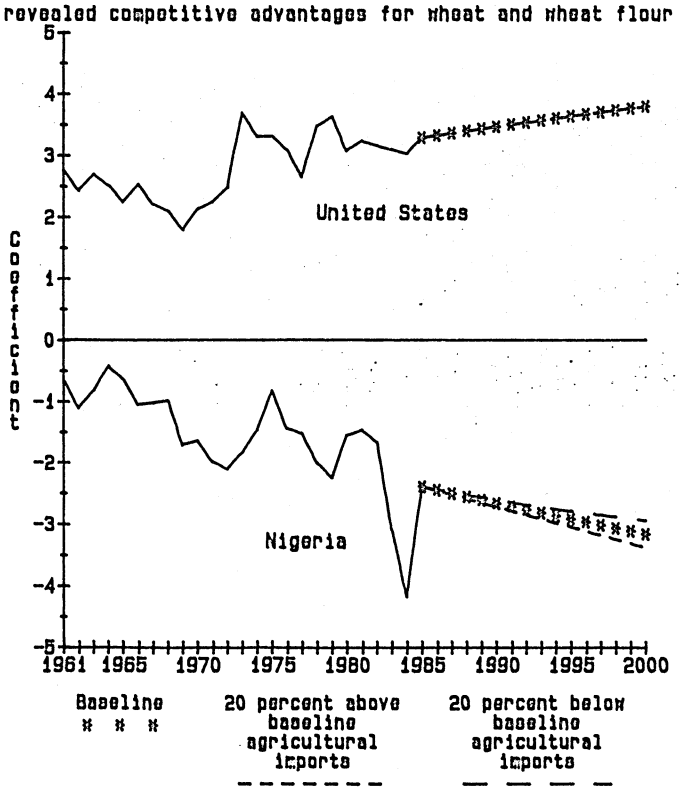



Figure 26
Indonesia and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

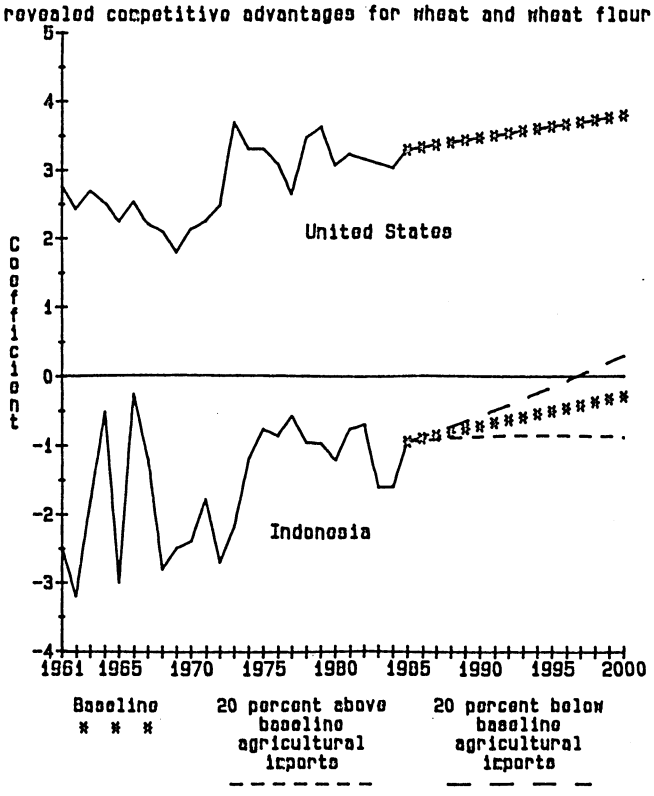



Figure 27
Bangladesh and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

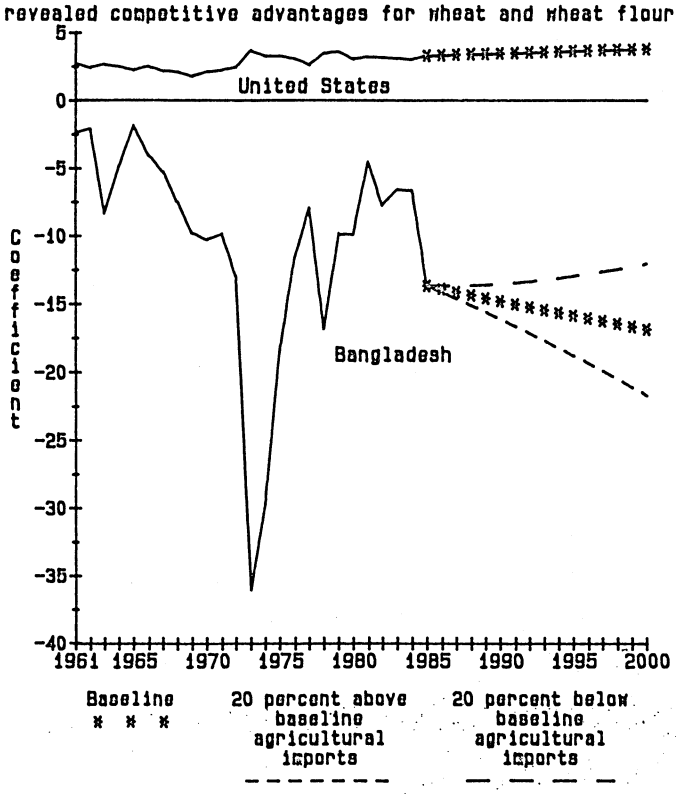


Figure 28
Chile and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

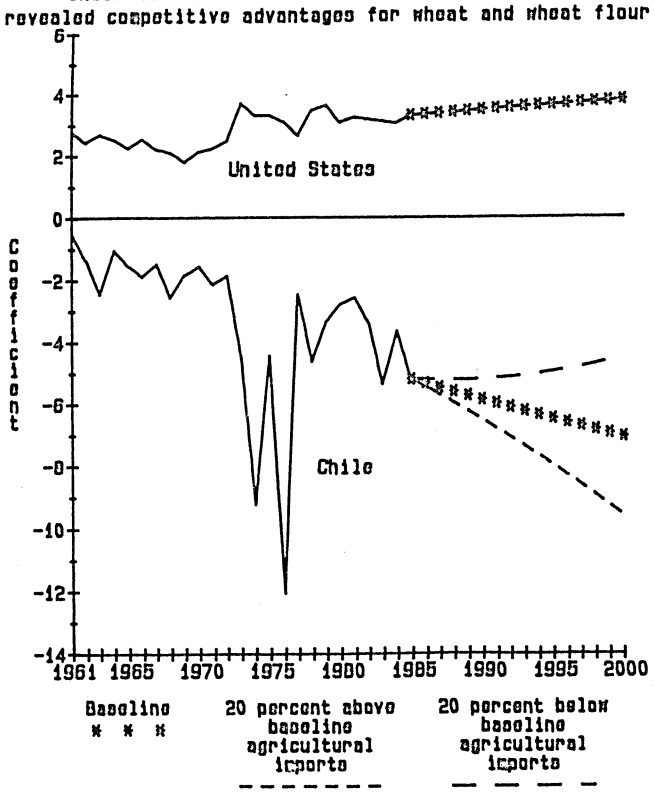



Figure 29
Peru and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

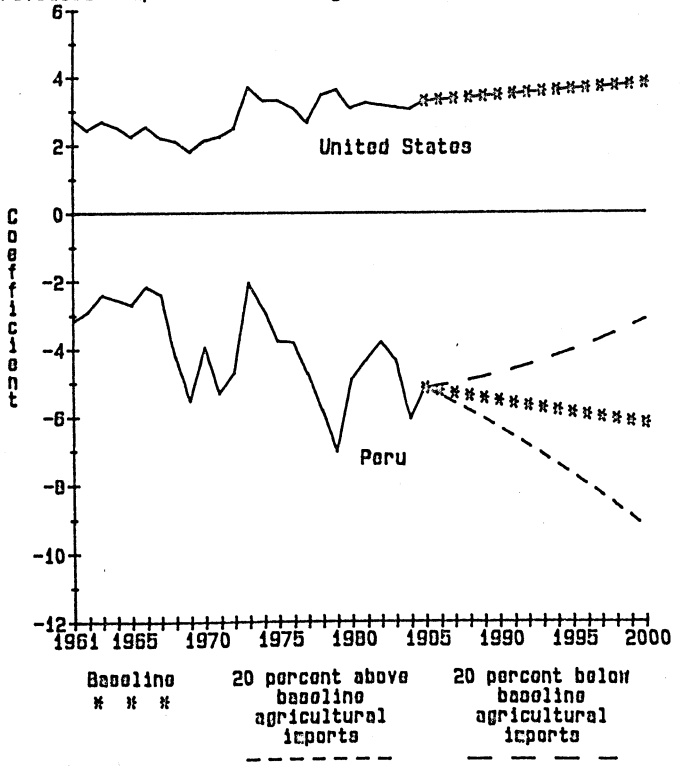



Figure 30
Venezuela and United States: Actual and projected revealed competitive advantages for wheat and wheat flour

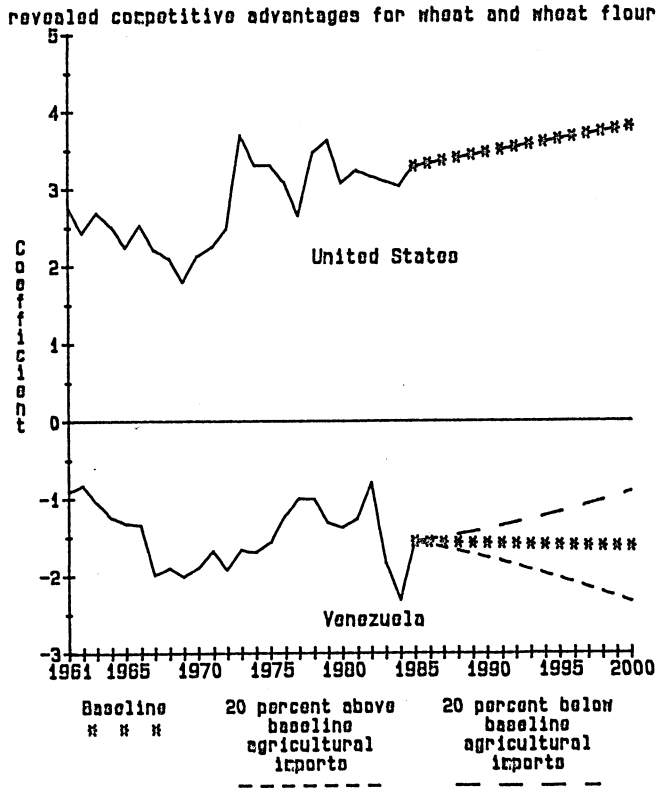
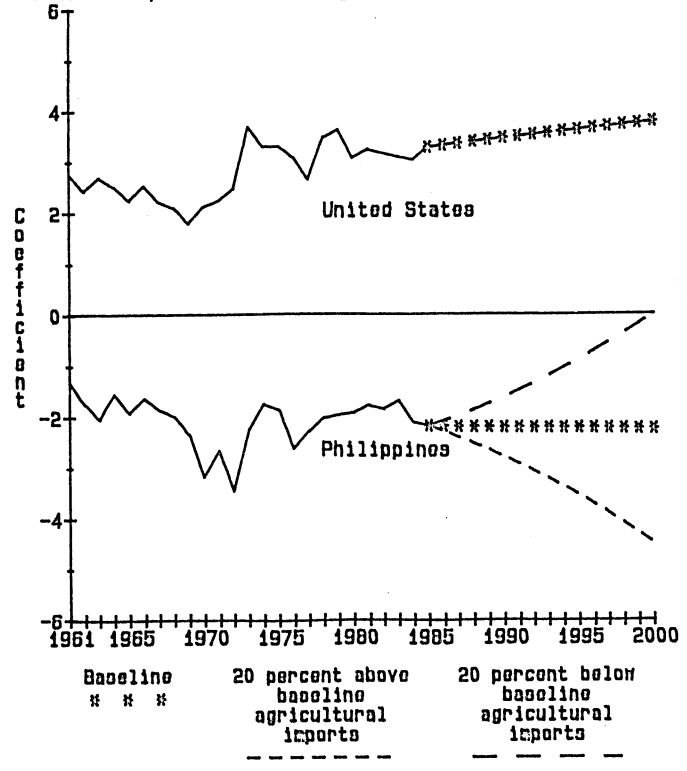



Figure 31
Philippines and United States: Actual and projected revealed competitive advantages for wheat and wheat flour



USSR, the largest single importer of wheat, shows a particularly severe drop in relative competitiveness (fig. 12).2/

Five of the 20 largest wheat-importing countries--Japan, South Korea, Indonesia, Brazil, and India--are characterized by rising baseline projected wheat RCA's. Should market behavior of the last 24 years be a guide for the next 16 years, these trends suggest that Japan, Indonesia, and Brazil will become relatively less important import growth markets; South Korea may achieve self-sufficiency; and India may become a net exporter of wheat and wheat flour.

In the post-World War II era, Japan successfully pursued a trade policy to maximize manufactured exports and to minimize essential agricultural imports because of national food security concerns. To achieve self-sufficiency in staple foods, the Japanese food grain sector received border protection and assistance in the form of high support prices. Between 1961 and 1984, the nominal rate of protection for Japanese wheat more than doubled and, by 1984, the producer price was 4.2 times the c.i.f. import price. A 20-percent increase or decrease in Japanese wheat and wheat flour imports does not alter Japan's competitive position because of the small weight wheat has compared with imports of other goods and services (fig. 15).

Beginning in the early seventies, South Korea and Indonesia initiated programs that are leading both countries toward self-sufficiency in food grains. Two of the three scenarios, when applied to South Korea and Indonesia, point to relative market losses continuing for the wheat-supplying countries (figs. 22 and 26). Policy shifts could conceivably occur in both South Korea and Indonesia that would cause wheat and wheat flour imports to rise 20 percent above baseline projections by the year 2000 (the third scenario). In this event, the relative competitive position of these two countries would be sustained at the 1980-84 levels.

India will probably not become a net exporter of wheat and wheat flour, as implied by projected wheat RCA's which turn positive in two of the three scenarios (fig. 18). An importing country like India can sometimes achieve self-sufficiency. It is difficult, however, for such a country to become a net exporter because of the need to achieve efficiencies capable of surmounting marketing and transportation costs required to operate as a supplier on the international market. Moreover, the historical pattern of wheat RCA's for India is very erratic. Despite the rising 1961-84 trend, pronounced downward movements of 1961-70, 1972-76, and 1977-83 diminish confidence in the baseline projection of relative wheat competitiveness for India.

One reason India's wheat RCA's are unlikely to turn positive is the latent demand for increased wheat consumption, evidenced by low caloric intake of food grains and a high income elasticity of wheat demand. Another reason is that the preferential treatment granted the Indian wheat subsector in recent years is not likely to continue. Though India still maintains high official prices for wheat, focuses research and development efforts on wheat, and subsidizes fertilizer in an attempt to promote the adoption of high-yielding varieties, its support in these areas is diminishing. Currently, efforts are being made to diversify agricultural production, placing greater emphasis on increasing oil and pulse crop production.

The 1961-84 period may not be a reasonable base from which to make wheat RCA projections for Brazil. During the midseventies, Brazil shifted policy, de-emphasizing self-sufficiency in wheat. Its declining wheat RCA pattern since 1975 suggests that Brazil will likely continue to be an important wheat and wheat flour import growth market, rather than a diminishing one (fig. 16).

2/ Given sufficient producer incentives, the USSR could become self-sufficient and even export wheat by 1990 according to the chief executive of the International Wheat Council.

## A GLIMPSE INTO THE FUTURE

The United States will likely face increasingly competitive pressures from other wheat-exporting countries in the future. The wheat RCA rankings of all principal competitors, except France, are projected to exceed the U.S. RCA by the year 2000. Moreover, the projected wheat competitive gap between the United States and France is shown to be narrowing.

Projected patterns for other agricultural commodities suggest that Australia, Canada, and France (unlike the United States and Argentina) will be comparatively more competitive in wheat than in coarse grains and oilseeds. Argentina will, however, continue to be the most competitive of all wheat producers. Yet, Argentina is likely to remain relatively more competitive in oilseeds and coarse grains than in wheat with export growth for soybeans being greater than for either food or feed grains, unless relative prices induce a different agricultural growth pattern.

Three-fourths of the significant wheat-importing countries display a growing competitive disadvantage for wheat throughout the remainder of this century, assuming no change occurs in trend projections. These projections provide indirect evidence of continued increases in the specialization of world production and growth in the relative import demand for wheat.

## REFERENCES


1. Balassa, Bela. "Trade Liberalization and 'Revealed' Comparative Advantage," The Manchester School, Vol. 33, No. 2, pp. 99-123.

2. Cesal, Lon C., and others. Agricultural Growth Markets in a World Economy. U.S. Dept. Agr., Econ. Res. Serv. (forthcoming).

3. Commission of the European Communities. The Agricultural Situation in the Community: 1985 Report, Brussels, Belgium: Office for Official Publications of the European Communities, 1986.

4. Commonwealth of Australia. Assistance to Australian Agriculture. Industries Assistance Commission, Information Paper. Canberra, Australia: Australian Government Publishing Service, 1983.

5. _____. The Wheat Industry. Industries Assistance Commission Report, No. 329. Canberra, Australia: C. J. Thompson Publishing Co., 1983.

6. Goodloe, Carol A. "Agricultural Trade Responsiveness in Western Hemisphere Countries." Staff Report AGES860326. U.S. Dept. Agr., Econ. Res. Serv., Apr. 1986.

7. Langley, Jim. "The Competitiveness of U.S. Agriculture in World Markets." Unpublished paper. U.S. Dept. Agr., Econ. Res. Serv., Mar. 21, 1986.

8. Paarlberg, Philip L., and others. "The U.S. Competitive Position in World Commodity Trade," Agricultural-Food Policy Review: Commodity Program Perspectives. AER-530. U.S. Dept. Agr., Econ. Res. Serv., July 1985.

9. Webb, Alan J., and others. "World Agricultural Markets and U.S. Farm Policy," Agricultural-Food Policy Review: Commodity Program Perspectives. AER-530. U.S. Dept. Agr., Econ. Res. Serv., July 1985.

10. Vollrath, Thomas. Dynamics of Comparative Advantage and the Resistance to Free Trade. FAER-214. U.S. Dept. Agr., Econ. Res. Serv., Aug. 1985.

11. _____. The Developmental Consequences of Unrestricted Trade. FAER-213. U.S. Dept. Agr., Econ. Res. Serv., May 1985.

## APPENDIX A--Notes About the RCA Measure

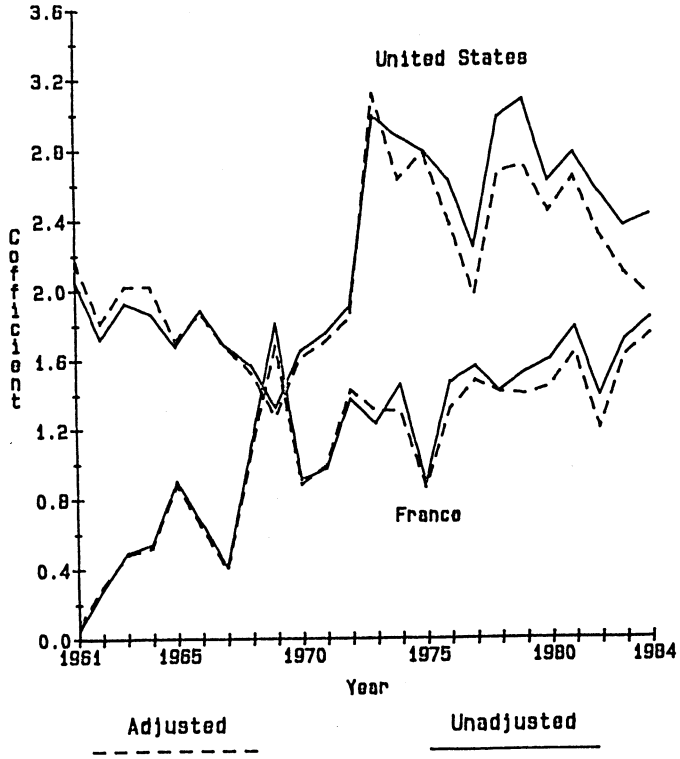
As constructed, the RCA indicator does not allow for noncomparability between import and export data which arises because the former contains certain handling, transportation, and spoilage costs not embedded into the latter. Handling, transportation, and spoilage costs are small relative to the value of traded commodities and are not, therefore, believed to significantly bias the competitiveness measure.

In addition, the RCA measure does not account for imbalances between exports and imports in the current account which may result because of international financial flows. Generally, trade surpluses or trade deficits are small relative to the value of goods and services a country exchanges in international markets and, hence, do not usually pose problems. However, should current account imbalances become relatively large, they can affect a country's performance in international markets by lowering its competitiveness in all traded commodities (except paper securities) when there are significant deficits and by raising its general level of competitiveness when there are substantial surpluses.

An indication of how forcing a country's current account to balance affects its competitiveness can be achieved by comparing the conventionally structured RCA with one based upon averaging exports and imports in all but the numerator of the RCA indicator. A comparison of alternative RCA measures for the United States and France in recent years shows that the coefficients adjusted for trade imbalances were lower than the unadjusted coefficients in both countries (app. fig. 1). The decline in adjusted RCA's for the United States was relatively greater during the eighties because of the larger U.S. trade deficit.

Appendix figure 1

United States and France: A comparison of adjusted and unadjusted revealed competitive advantages for wheat and wheat flour



## APPENDIX B--Competitiveness Rankings

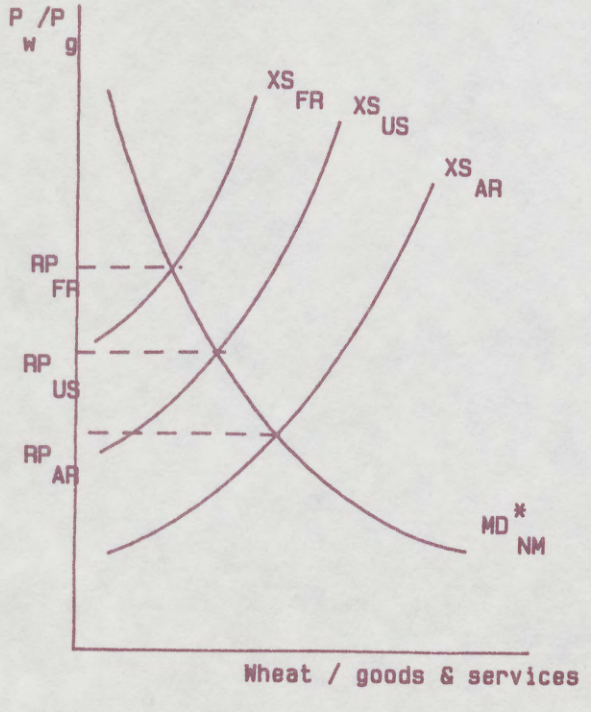
Theoretically, RCA coefficients are analogous to relative commodity prices--providing a basis for a cardinal ranking of competitiveness. A graphic illustration of relative wheat advantage is presented in appendix figure 2. The United States, France, and Argentina (three significant wheat exporters) possess relative export supply functions portrayed as $XS_{US}$, $XS_{FR}$, and $XS_{AR}$, respectively. The intersection of each supplier's wheat relative export supply functions with the wheat relative import demand function for the world ($MD^*_{NM}$) determines each country's relative advantage ranking. The United States has a relative cost advantage (disadvantage) with respect to France (Argentina) in supplying wheat to the rest of the world because its relative wheat price is below (above) that of the French (Argentine) relative wheat price.

RCA coefficients for supplying (demanding) countries differ from their relative export supply (relative import demand) prices in several respects. RCA's are standardized by relative world commodity trade shares. This enables comparisons to be made among more than two trading entities. Moreover, they are expressed in net trade terms. That is, imports have been subtracted from exports. In the context of relative competitiveness, a more precise description of XS would be "comparative standardized net export supply" and a more precise description of MD would be "comparative standardized net import demand."

Elementary trade theory facilitates understanding why RCA coefficients can be viewed as relative prices. The pure classical theory of exchange abstracts from the money market. Therefore, commodity prices are expressed in barter terms. For example, given a budget constraint AB in a two-good world, the relative price of wheat ($P_w/P_g$) equals EC/DE (app. fig. 3). Assuming no money illusion and real prices, RCA's can be viewed as quantity ratios. Under these conditions, the RCA reciprocal is equivalent to the relative wheat price ($P_w/P_g$).

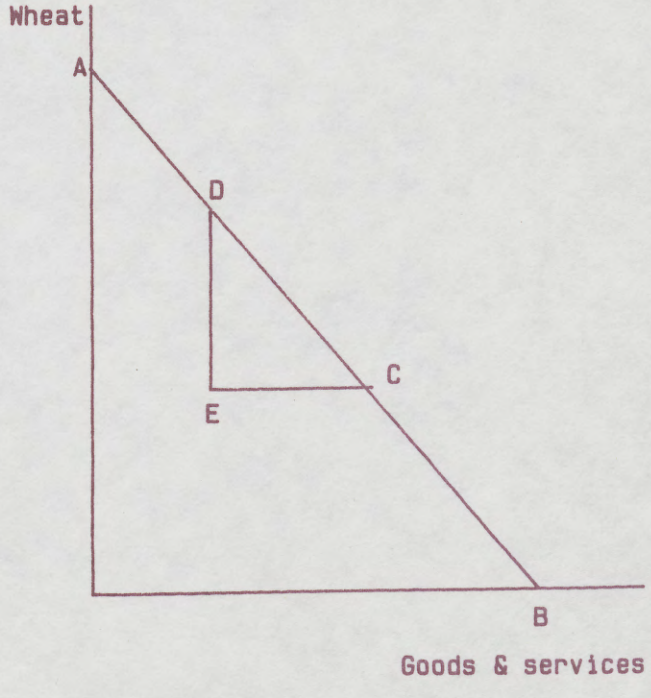
Appendix figure 2

Relative advantage for wheat: United States, Argentina and France




Appendix figure 3

The budget line




*U.S. GOVERNMENT PRINTING OFFICE:1987-180-916:40381/ERS